REMARKS

This paper is responsive to the Non-Final Office Action dated March 2, 2005. Claims 1-31 were examined. The disclosure is objected to for including informalities. Claims 1-10 are indicated as being allowable over the prior art of record. Claims 11-31 strand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,774,849 to Benyassine et al. in view of U.S. Patent No. 4,689,760 to Lee et al.

Amendments to the Specification

The specification is amended to update dependency information.

Allowable Subject Matter

Applicant appreciates the indication of allowable subject matter in claims 1-10. Although Applicant believes that those claims are allowable over the art of record, the Examiner's statement of reasons for the indication of allowable subject matter does not coincide with the claims. Applicant does not acquiesce in additional limitations included in the statement.

Claim Amendments

Claims 1, 11, 12, 14, and 21 are amended to clarify the invention.

Rejections Under 35 U.S.C. § 103(a)

Claims 11-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,774,849 to Benyassine et al. in view of U.S. Patent No. 4,689,760 to Lee et al. Regarding claim 11, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> a threshold determiner coupled to receive the energy signal from the transform determiner and which outputs at least an energy threshold for each frame portion based at least in part on a value of the energy signal during a previous frame portion,

as required by claim 11. The Office Action relies on blocks 230, 235, and 240 of Fig. 2, and col. 3, lines 34-50 to supply this teaching. These portions of Benyassine teach "using multi-boundary decision regions in the space of the four difference measures" (col. 3, lines 35-36). Although Benyassine teaches parameters that are determined by differences between current frame parameters and running averages of the background noise characteristics (col. 3, lines 25-27), they are not thresholds as claimed. Benyassine teaches further, at col. 5, lines 51-55, that "[a] predetermined decision region of the four dimensional Euclidean space...is defined as [sic] non-active-voice region, and its complementary [sic] is defined as active-voice region" (emphasis added). The boundary decisions are made by comparing the vector defined by the four difference parameters to fourteen predetermined boundaries defined by a1-a14 and b1-b14 (col. 5, line 48 - col. 6, line 20, claim 6, and claim 13). Assuming arguendo that the predetermined boundaries a1-a14 and b1-b14 are similar to the energy threshold of claim 11, Benyassine fails to teach or suggest how these boundaries are computed. Similarly, Lee teaches testing whether spectral values are greater than a predetermined threshold (col. 13, lines 1-4). Therefore, Benyassine, alone or in combination with Lee, fails to teach or suggest a threshold determiner coupled to receive at least the energy signal from the transform determiner and which outputs at least an energy threshold for each frame portion based at least in part on a value of the energy signal during a previous frame portion, as recited in claim 11.

In addition, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> a signal processor coupled to receive at least the energy threshold, the noise indicator, and the energy signal and which outputs at least a signal indicating when the input signal includes the at least one tone having a known frequency and duration, based at least in part on the energy threshold, the noise indicator and the energy signal,

as required by claim 11. The Office Action apparently relies on the voice activity detection process taught at col. 3, line 7 - col. 7, line 15. This portion of Benyassine teaches a method for "generating frame voicing decisions for an incoming speech signal having periods of active

voice and non-active voice for a speech encoder in a speech communications system" (see col. 2, lines 23-26). The method of Benyasine defines a four-dimensional Euclidean space and determines whether the four difference parameters, computed for each frame, define a point within an active voice region of the Euclidean space (col. 5, line 48- col. 6, line 20). Since Benyassine teaches detecting voice, not tones having known frequencies and durations, the Office Action relies on Lee to supply this teaching.

Lee teaches that the DTMF encoding technique uses four low band frequencies and four high band frequencies (col. 1, lines 17-22). At col. 4, lines 54-66, Lee teaches applying three criteria for validating a received sample as a DTMF tone:

1. Accept only signals with exactly two of the expected 8 frequencies, one in each group. Both tone signals must be nearly the same in amplitude and within the range of the expected signal strength.
2. Reject signals which are accompanied by significant energy at frequencies other than the predetermined DTMF frequencies.
3. Accept only signals that satisfy the specification minimum timing requirements such as minimum tone duration and minimum interdigit pauses

(emphasis added). Lee detects DTMF signals using a combination of frequency domain analysis and time domain analysis and rejects all signals other than those signals with DTMF frequencies satisfying particular timing requirements.

Assuming arguendo that the difference parameters of Benyassine are similar to the energy threshold, the noise indicator, and the energy signal recited in claim 11, there is no teaching or suggestion to modify the difference parameters of Benyassine to perform the DTMF detection of Lee. The Office Action fails to point out how to modify the difference parameters of Benyassine to reject signals at frequencies other than DTMF frequencies. The difference parameters of Benyassine are computed in the time domain, whereas Lee requires determining two of the three above criteria in the frequency domain. The Office Action and the references fail to teach or suggest how to map Benyassine's parameters into the frequency domain.

Moreover, Lee distinguishes DTMF detection from speech detection and that "false validation of tone signals resulting from the occurrence of coincidental speech or other signals at the DTMF frequencies" (col. 4, lines 24-26). The difference parameters of Benyassine are used to detect speech by determining if, for each frame, a vector defined by these parameters lies

within an active-voice region. Benyassine fails to teach or suggest that these parameters may be modified to reject signals with exactly two of the expected frequencies, as required by Lee. To do so would require Benyassine to reject non-DTMF signals that are otherwise included in the voice band, thus rendering Benyassine unsatisfactory for its intended purpose of detecting voice activity. Therefore, there is no suggestion or motivation to make the proposed modification. See MPEP § 2143.01.

Accordingly, Applicant respectfully requests that the rejection of claim 11 and all claims dependent thereon be withdrawn.

Regarding claim 22, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame,

as required by claim 22. The Office Action relies on blocks 230, 235, and 240 of Fig. 2, and col. 3, lines 34-50 to supply this teaching. These portions of Benyassine teach "using multi-boundary decision regions in the space of the four difference measures" (col. 3, lines 35-36). Although Benyassine teaches parameters that are determined by differences between current frame parameters and running averages of the background noise characteristics (col. 3, lines 25-27), they are not thresholds as claimed. Benyassine teaches further, at col. 5, lines 51-55, that "[a] predetermined decision region of the four dimensional Euclidean space...is defined as [sic] non-active-voice region, and its complementary [sic] is defined as active-voice region" (emphasis added). The boundary decisions are made by comparing the vector defined by the four difference parameters to fourteen predetermined boundaries defined by a1-a14 and b1-b14 (col. 5, line 48 - col. 6, line 20, claim 6, and claim 13). Assuming arguendo that the predetermined boundaries a1-a14 and b1-b14 are similar to the energy threshold detection value of claim 22,

Benyassine fails to teach or suggest how these boundaries are computed. Similarly, Lee teaches testing whether spectral values are greater than a predetermined threshold (col. 13, lines 1-4). Therefore, Benyassine, alone or in combination with Lee, fails to teach or suggest the claimed generating of an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame.

In addition, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> detecting, based at least in part on the energy threshold detection value, at least a first tone in the input signal including a plurality of tones, the first tone having a predetermined frequency and predetermined duration,

as required by claim 22. The Office Action apparently relies on the voice activity detection process taught at col. 3, line 7 - col. 7, line 15. This portion of Benyassine teaches a method for "generating frame voicing decisions for an incoming speech signal having periods of active voice and non-active voice for a speech encoder in a speech communications system" (see col. 2, lines 23-26). The method of Benyasine defines a four-dimensional Euclidean space and determines whether the four difference parameters, computed for each frame, define a point within an active voice region of the Euclidean space (col. 5, line 48- col. 6, line 20). Since Benyassine teaches detecting voice, not tones having known frequencies and durations, the Office Action relies on Lee to supply this teaching.

Lee teaches that the DTMF encoding technique uses four low band frequencies and four high band frequencies (col. 1, lines 17-22). At col. 4, lines 54-66, Lee teaches applying three criteria for validating a received sample as a DTMF tone:

> 1. Accept only signals with exactly two of the expected 8 frequencies, one in each group. Both tone signals must be nearly the same in amplitude and within the range of the expected signal strength.

2. Reject signals which are accompanied by significant energy at frequencies other than the predetermined DTMF frequencies.
3. Accept only signals that satisfy the specification minimum timing requirements such as minimum tone duration and minimum interdigit pauses

(emphasis added). Lee detects DTMF signals using a combination of frequency domain analysis and time domain analysis and rejects all signals other than those signals with DTMF frequencies satisfying particular timing requirements.

Assuming arguendo that the difference parameters of Benyassine are similar to the energy threshold detection value recited in claim 22, there is no teaching or suggestion to modify the difference parameters of Benyassine to perform the DTMF detection of Lee. The Office Action fails to point out how to modify the difference parameters of Benyassine to reject signals at frequencies other than DTMF frequencies. The difference parameters of Benyassine are computed in the time domain, whereas Lee requires determining two of the three above criteria in the frequency domain. The Office Action and the references fail to teach or suggest how to map Benyassine's parameters into the frequency domain.

Moreover, Lee distinguishes DTMF detection from speech detection and that "false validation of tone signals resulting from the occurrence of coincidental speech or other signals at the DTMF frequencies" (col. 4, lines 24-26). The difference parameters of Benyassine are used to detect speech by determining if, for each frame, a vector defined by these parameters lies within an active-voice region. Benyassine fails to teach or suggest that these parameters may be modified to reject signals with exactly two of the expected frequencies, as required by Lee. To do so would require Benyassine to reject non-DTMF signals that are otherwise included in the voice band, thus rendering Benyassine unsatisfactory for its intended purpose of detecting voice activity. Therefore, there is no suggestion or motivation to make the proposed modification. See MPEP § 2143.01.

Accordingly, Applicant respectfully requests that the rejection of claim 22 and all claims dependent thereon be withdrawn.

Regarding claim 31, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

means for generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame,

as required by claim 31. The Office Action relies on blocks 230, 235, and 240 of Fig. 2, and col. 3, lines 34-50 to supply this teaching. These portions of Benyassine teach "using multi-boundary decision regions in the space of the four difference measures" (col. 3, lines 35-36). Although Benyassine teaches parameters that are determined by differences between current frame parameters and running averages of the background noise characteristics (col. 3, lines 25-27), they are not thresholds as claimed. Benyassine teaches further, at col. 5, lines 51-55, that "[a] predetermined decision region of the four dimensional Euclidean space...is defined as [sic] non-active-voice region, and its complementary [sic] is defined as active-voice region" (emphasis added). The boundary decisions are made by comparing the vector defined by the four difference parameters to fourteen predetermined boundaries defined by a1-a14 and b1-b14 (col. 5, line 48 - col. 6, line 20, claim 6, and claim 13). Assuming arguendo that the predetermined boundaries a1-a14 and b1-b14 are similar to the energy threshold detection value of claim 31, Benyassine fails to teach or suggest how these boundaries are computed. Similarly, Lee teaches testing whether spectral values are greater than a predetermined threshold (col. 13, lines 1-4). Therefore, Benyassine, alone or in combination with Lee, fails to teach or suggest the claimed means for generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame.

In addition, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

means for detecting at least a first tone in the input signal including a plurality of tones, the first tone having a predetermined frequency and predetermined duration, based at least in part on the energy threshold detection value,

as required by claim 31. The Office Action apparently relies on the voice activity detection process taught at col. 3, line 7 - col. 7, line 15. This portion of Benyassine teaches a method for "generating frame voicing decisions for an incoming speech signal having periods of active voice and non-active voice for a speech encoder in a speech communications system" (see col. 2, lines 23-26). The method of Benyasine defines a four-dimensional Euclidean space and determines whether the four difference parameters, computed for each frame, define a point within an active voice region of the Euclidean space (col. 5, line 48- col. 6, line 20). Since Benyassine teaches detecting voice, not tones having known frequencies and durations, the Office Action relies on Lee to supply this teaching.

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3. Accept only signals that satisfy the specification minimum timing requirements such as minimum tone duration and minimum interdigit pauses

(emphasis added). Lee detects DTMF signals using a combination of frequency domain analysis and time domain analysis and rejects all signals other than those signals with DTMF frequencies satisfying particular timing requirements.

Assuming arguendo that the difference parameters of Benyassine are similar to the energy threshold detection value recited in claim 31, there is no teaching or suggestion to modify the difference parameters of Benyassine to perform the DTMF detection of Lee. The Office Action fails to point out how to modify the difference parameters of Benyassine to reject signals

at frequencies other than DTMF frequencies. The difference parameters of Benyassine are computed in the time domain, whereas Lee requires determining two of the three above criteria in the frequency domain. The Office Action and the references fail to teach or suggest how to map Benyassine's parameters into the frequency domain.

Moreover, Lee distinguishes DTMF detection from speech detection and that "false validation of tone signals resulting from the occurrence of coincidental speech or other signals at the DTMF frequencies" (col. 4, lines 24-26). The difference parameters of Benyassine are used to detect speech by determining if, for each frame, a vector defined by these parameters lies within an active-voice region. Benyassine fails to teach or suggest that these parameters may be modified to reject signals with exactly two of the expected frequencies, as required by Lee. To do so would require Benyassine to reject non-DTMF signals that are otherwise included in the voice band, thus rendering Benyassine unsatisfactory for its intended purpose of detecting voice activity. Therefore, there is no suggestion or motivation to make the proposed modification. See MPEP § 2143.01.

Accordingly, Applicant respectfully requests that the rejection of claim 31 and all claims dependent thereon be withdrawn.

In summary, claims 1-31 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

PATENT

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